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(73) Titulaire(s):
Guangzhou Shaweishi Electronic Technology Co., Ltd.
– Guangzhou City (Chine)

(72) Inventeur(s):
QI Kuankuan – Guangzhou City (Chine)

(74) Mandataire(s):
ZHAOffice SPRL – 5030 GEMBLOUX (Belgique)

(54) **SPHERICAL GEAR TRANSMISSION MECHANISM.**

(57) The present invention relates to a mechanical transmission mechanism, and particularly relates to a spherical gear transmission mechanism in which an inclined angle between an input shaft and an output shaft can be changed when power is transmitted. The spherical gear transmission mechanism includes two components that are fixed and meshed with each other, each of which is composed of a teeth meshing portion and a mastoid meshing portion; the teeth meshing portion is in a semi-spherical structure with a platform on the top end; a plurality of meshing teeth are uniformly distributed on the circumference of the teeth meshing portion; the mastoid meshing portion is arranged on the platform on the top end of the teeth meshing portion; one of the mastoid meshing portions is a plurality of mastoid protrusions uniformly distributed on the top end of the teeth meshing portion, and the other mastoid meshing portion is a column arranged on the top end of the teeth meshing portion; and the end surface of the column is provided with pits matched with the mastoid protrusions. The spherical gear transmission mechanism is simple in structure and wide in application range, and has high application value and economic benefits, and the inclined angle between the input shaft and the output shaft can be changed

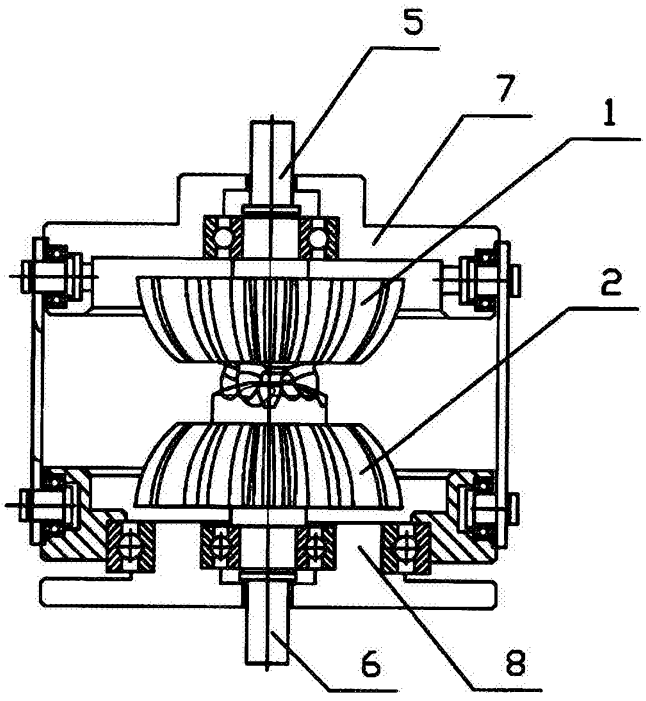

FIG. 1

SPHERICAL GEAR TRANSMISSION MECHANISM

BACKGROUND

Technical Field

The present invention relates to a mechanical transmission mechanism, and particularly relates to a spherical gear transmission mechanism in which an inclined angle between an input shaft and an output shaft can be changed when power is transmitted.

Related Art

The existing gear transmission mechanism is often used for rotational motion between transmission shafts, when an ordinary cylindrical gear transmits power, an input shaft and an output shaft must be arranged in parallel; a cone gear can realize power transmission at any inclined angle between the input shaft and the output shaft. However, for the above two gear transmission structures, the inclined angle between the input shaft and the output shaft must be changeless, and the inclined angle between the input shaft and the output shaft cannot be changed during working. In an industrial robot arm joint and other universal transmission regulating mechanisms, a gear transmission mechanism in which the inclined angle between the input shaft and the output shaft can be changed at any time is often needed. Another Chinese patent 2013205872680 of an inventor discloses a balance staff type gear transmission mechanism in which a gear having a special gear structure is adopted to realize that the inclined angle between the input shaft and the output shaft during power transmission can be changeable, so as to expand the application field of a gear mechanism. But, this balance staff type gear transmission mechanism just can realize that the inclined angle between the input shaft and the output shaft is changed on the same plane and cannot realize three-dimensional motion change.

Summary

With respect to the disadvantages of the above prior art, it is an object of the present invention to provide a spherical gear transmission mechanism.

In order to realize the above object, the present invention adopts the following technical scheme:

A X spherical gear transmission mechanism includes a component I and a component II that are fixed and meshed with each other, wherein each of the component I and the component II is composed of a teeth meshing portion and a mastoid meshing portion; the teeth meshing portion is in a semi-spherical structure with a platform on the top end; a plurality of meshing teeth are uniformly distributed on the circumference of the teeth meshing portion; the mastoid meshing portion is arranged on the platform on the top end of the teeth meshing portion; the mastoid meshing portion of one of the component I and the component II is a plurality of mastoid protrusions uniformly distributed on the top end of the teeth meshing portion, and the mastoid meshing portion of the other of the component I and the component II is a column arranged on the top end of the teeth meshing portion; and the end surface of the column is provided with pits matched with the mastoid protrusions.

One of the plurality of mastoid protrusions is located in the center of the platform on the top end of the teeth meshing portion, the other mastoid protrusions are uniformly distributed around the center; and the bottom surface of the teeth meshing portion is fixedly connected with shaft rods, and the shaft rods are mounted on bases through bearings.

The bearings are aligning bearings.

Due to adoption of the above structure, the spherical gear transmission mechanism is simple in structure; the inclined angle between the input shaft and the output shaft can be changeable; the spherical gear transmission mechanism is wide in application range, and can be applied to a gearbox having a changeable output direction and a transmission mechanism for improving and simplifying many

mechanical products except for advantages of facilitating improvement of working efficiency of a robot arm and optimization of original transmission mechanisms, etc., so as to improve transmission efficiency and reduce product cost; and the spherical gear transmission mechanism can also be used as a single universal transmission regulating mechanism to be matched with a speed changer, and thus has high application value and economic benefits.

Brief Description of Drawings

FIG.1 is a structure diagram according to one embodiment of the present invention.

FIG.2 is a structure diagram according to another embodiment of the present invention.

FIG.3 is a stereostructure diagram of a component I.

FIG.4 is a stereostructure diagram of a component II.

FIG.5 is a structure diagram illustrating a meshing state of the component I and the component II.

Description of Embodiments

The embodiments of the present invention will be described in detail below with reference to accompanying drawings, but, the present invention can be implemented in various different modes defined and covered by claims.

As illustrated in FIG. 1 to FIG. 5, a spherical gear transmission mechanism provided by the present invention includes a component I 1 and a component II 2 that are fixed and meshed with each other, wherein each of the component I 1 and the component II 2 is composed of a teeth meshing portion and a mastoid meshing portion. As illustrated in FIG. 3 and FIG. 4, the teeth meshing portion is in a semi-spherical structure with a platform on the top end; a plurality of meshing teeth are uniformly distributed on the circumference of the teeth meshing portion; the mastoid meshing portion is arranged on the platform on the top end of the teeth meshing portion; the mastoid meshing portion of one of the component I and the

component II is a plurality of mastoid protrusions 3 uniformly distributed on the top end of the teeth meshing portion, and the mastoid meshing portion of the other of the component I 1 and the component II 2 is a column arranged on the top end of the teeth meshing portion; and the end surface of the column is provided with pits 4 matched with the mastoid protrusions 3.

One of the plurality of mastoid protrusions 3 is located in the center of the platform on the top end of the teeth meshing portion, the other mastoid protrusions 3 are uniformly distributed around the center, and the top ends of the other mastoid protrusions 3 are slightly inclined outwardly so as to realize effective meshing in an inclined angle range as large as possible; and as illustrated in FIG. 1 and FIG. 2, the bottom surface of the teeth meshing portion is fixedly connected with shaft rods 5 and 6, and the shaft rods 5 and 6 are mounted on bases 7 and 8 through bearings, the bases 7 and 8 can adopt multiple structure forms so that the component I 1 and the component II 2 are maintained in the effective meshing range.

As illustrated in FIG. 2, the bearings are aligning bearings, the end surfaces of the bearings and the end surfaces of the component I 1 and the component II 2 can be in non-parallel state, and good operation is maintained. Of course, as illustrated in FIG. 1, a cylinder bearing is also adopted, which is matched with a bracket having a certain structure to realize that the inclined angle between the end surfaces of the component I 1 and the component II 2 can be changeable.

When in use, the bases 7 and 8 can swing and rotate at random in the effective meshing range, as illustrated in FIG. 5, both of the component I 1 and the component 2 can be effectively meshed, and when the component I 1 and the component II 2 are meshed relatively and their end surfaces are mutually parallel, the mastoid protrusions 3 are fitted in the pits 4, so as to realize effective meshing; when the inclined angle of the two end surfaces are gradually increased, the meshing between the component I 1 and the component II 2 is changed from mastoid meshing to mutual meshing between meshing teeth, so power transmission is still realized.

The above description is merely a preferred embodiment of the present

invention, and does not therefore limit the patent scope of the present invention, equivalent structures or equivalent flow variations made by utilizing specification and attached contents of the present invention are directly or indirectly applied to the other related technical fields, and are all included within the patent protection scope of the present invention.

Revendications

1. Mécanisme de transmission à engrenage sphérique, comprenant un composant I (1) et un composant II (2) qui sont fixés et s'engrènent l'un avec l'autre, dans lequel chacun du composant I (1) et du composant II (2) est composé d'une partie d'engrènement à dents et d'une partie d'engrènement de type mastoïde ; la partie d'engrènement à dents est de structure semi-sphérique avec une plate-forme sur l'extrémité supérieure; une pluralité de dents d'engrènement sont uniformément réparties sur la circonférence de la partie d'engrènement à dents, la partie d'engrènement de type mastoïde est agencée sur la plate-forme sur l'extrémité supérieure de la partie d'engrènement à dents ; la partie d'engrènement de type mastoïde de l'un des composants I (1) et II (2) est une pluralité de protubérances (3) de type mastoïde réparties uniformément sur l'extrémité supérieure de la partie d'engrènement à dents, et la partie d'engrènement de type mastoïde de l'autre parmi le composant I (1) et le composant II (2) est une colonne disposée sur l'extrémité supérieure de la partie d'engrènement à dents ; et la surface d'extrémité de la colonne est pourvue de puits (4) qui concordent avec les protubérances (3) de type mastoïde.
2. Mécanisme de transmission à engrenage sphérique selon la revendication 1, dans lequel l'une parmi la pluralité de protubérances (3) de type mastoïde est située au centre de la plate-forme sur l'extrémité supérieure de la partie d'engrènement à dents, les autres protubérances (3) de type mastoïde étant réparties uniformément autour du centre ; et la surface inférieure de la partie d'engrènement à dents est reliée de manière fixe à des tiges d'arbre (5,6), et les tiges d'arbre sont montées sur des bases (7,8) par l'intermédiaire de paliers.
3. Mécanisme de transmission à engrenage sphérique selon la revendication 2, dans lequel les paliers sont des paliers alignés.

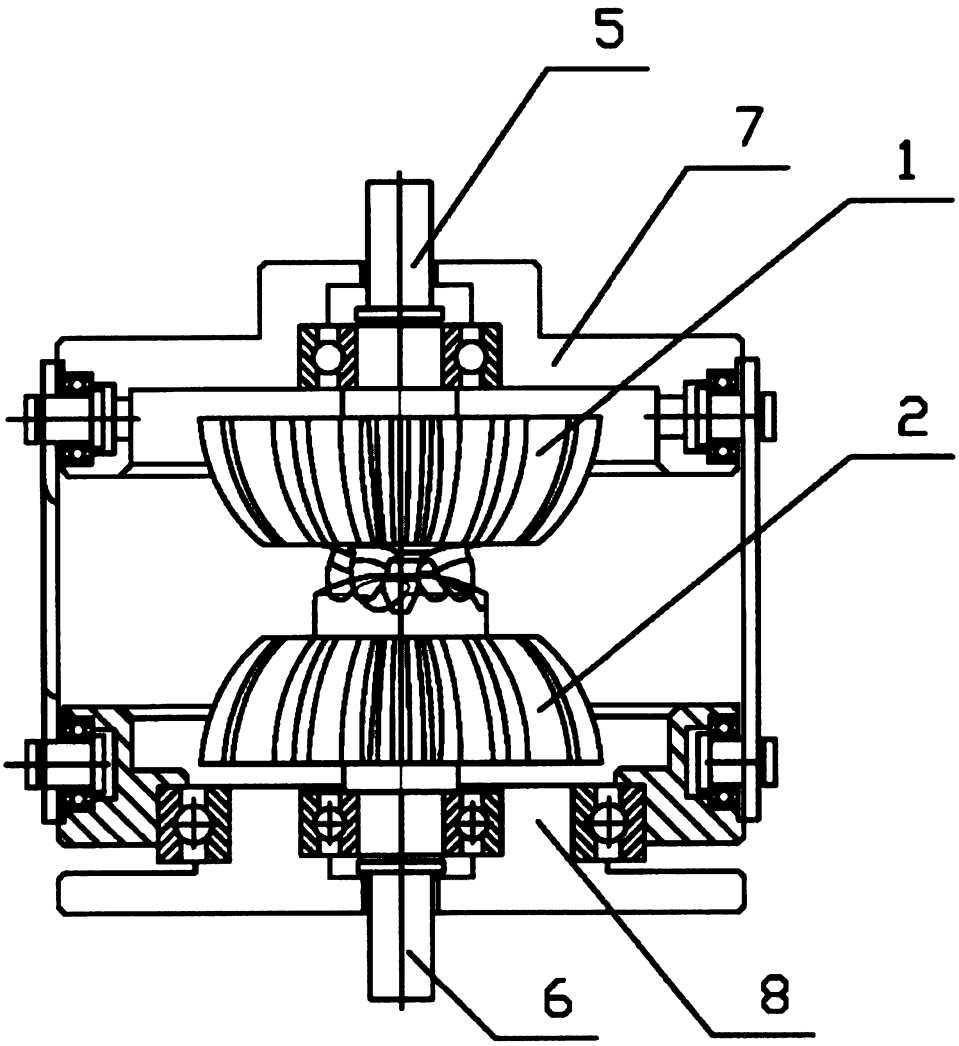

FIG. 1

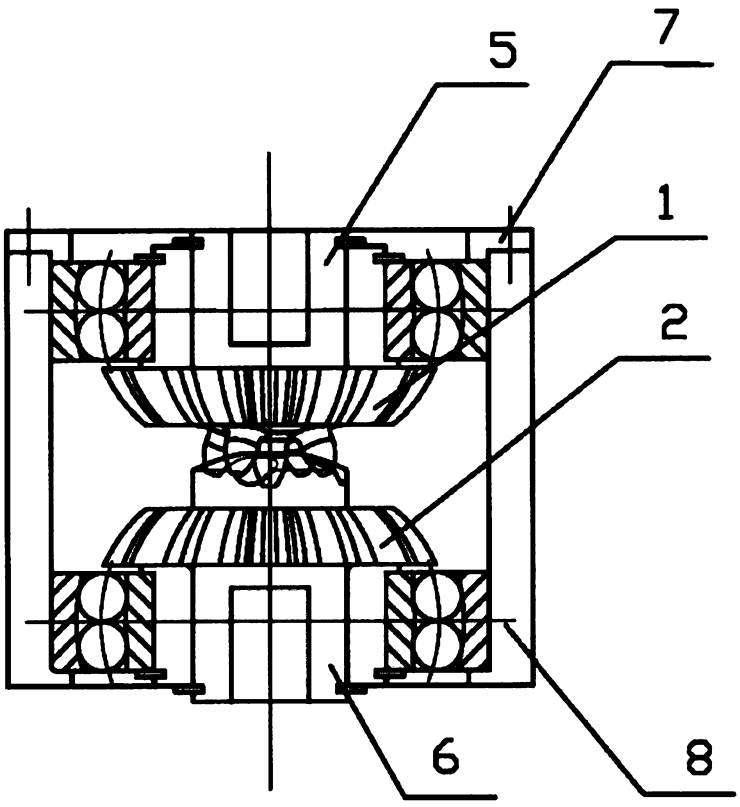

FIG. 2

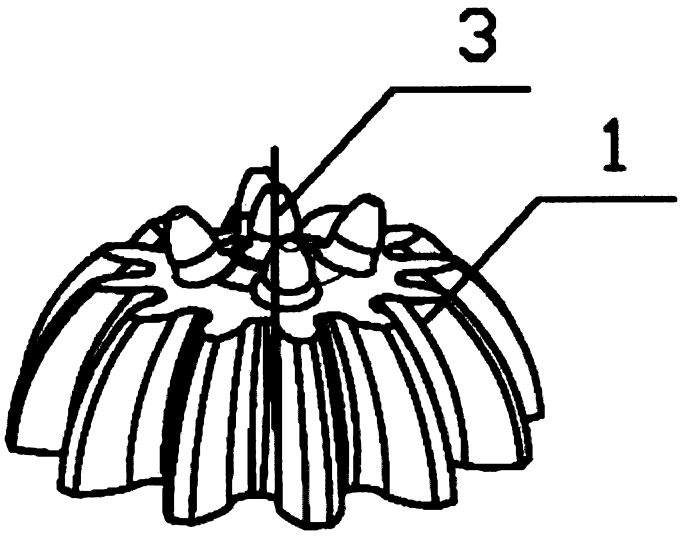

FIG. 3

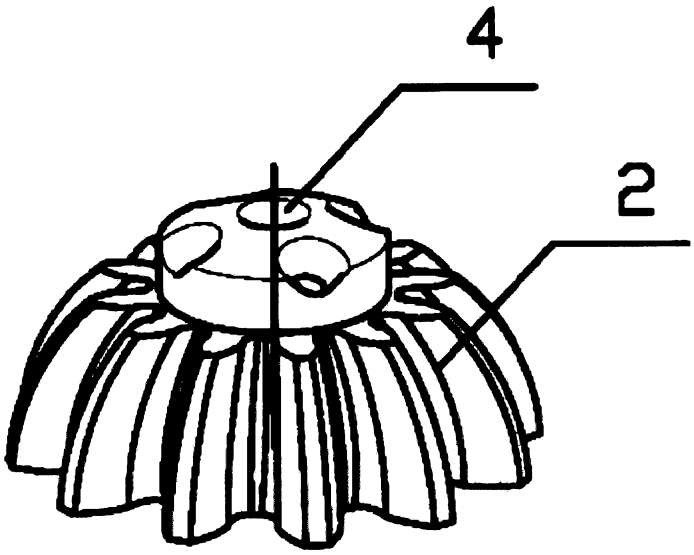

FIG. 4

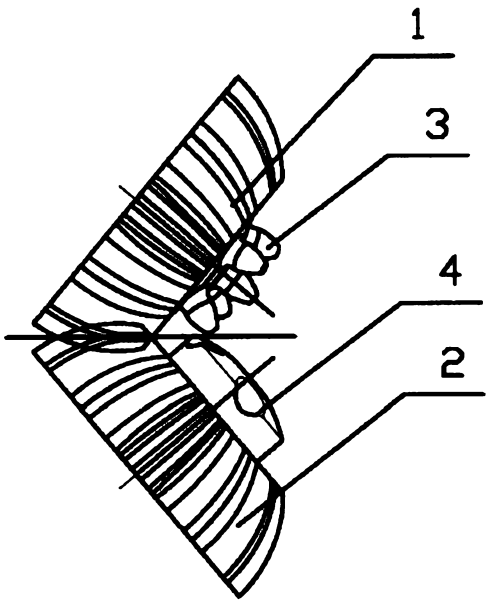

FIG. 5

ABSTRACT

SPHERICAL GEAR TRANSMISSION MECHANISM

The present invention relates to a mechanical transmission mechanism, and particularly relates to a spherical gear transmission mechanism in which an inclined angle between an input shaft and an output shaft can be changed when power is transmitted. The spherical gear transmission mechanism includes two components that are fixed and meshed with each other, each of which is composed of a teeth meshing portion and a mastoid meshing portion; the teeth meshing portion is in a semi-spherical structure with a platform on the top end; a plurality of meshing teeth are uniformly distributed on the circumference of the teeth meshing portion; the mastoid meshing portion is arranged on the platform on the top end of the teeth meshing portion; one of the mastoid meshing portions is a plurality of mastoid protrusions uniformly distributed on the top end of the teeth meshing portion, and the other mastoid meshing portion is a column arranged on the top end of the teeth meshing portion; and the end surface of the column is provided with pits matched with the mastoid protrusions. The spherical gear transmission mechanism is simple in structure and wide in application range, and has high application value and economic benefits, and the inclined angle between the input shaft and the output shaft can be changed.

Fig. 1